

THESIS

on

APPENDICITIS

by

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M. B. C. M. (1892)

APPENDICITIS.

Although a great deal has been done and written in the course of last ten years, in connection with disease of Vermiform Appendix, still a great diversity of opinion exists as to propriety of operative treatment. I venture, therefore, to bring before you records of personal observations made in cases of Appendicitis, which recovered without operation, Localised Suppurating Appendicitis, Acute Perforating Appendicitis, and Relapsing Appendicitis, gathered from a four years experience in provincial Hospitals and in private practice.

HISTORICAL REVIEW

All Inflammatory conditions in right iliac fossa, for first half of this century were attributed to coecum and it is only within recent times that this coecal origin has been questioned. During the earlier period descriptions of phlegmon of the right iliac fossa were written, but no mention whatever was made of the Appendix being a probable cause. In 1843, we have a series of cases published by VOLTZ, attributed to disease of Appendix, and in this same year Catarrhal inflammation of Appendix was first recognised by ROKITANSKY, which he stated resulted from presence of faecal matters and foreign bodies. So far cases where peritoneum was attacked are spoken of as comparatively rare. In 1856 LEWIS states that as a result of perforation of Appendix, general peritonitis is always speedily fatal but that previous adhesions may circumscribe the discharge. WITH of Copenhagen, in 1880, was the first to state his disbelief in coecal origin, and in 1886 FITZ of America served to put matter on a clear basis, and in a large number of cases, shewed that in only three, did he find a perforating inflammation of coecum. BRISTOWE speaks of " typhlitis " and " perityphlitis " Typhlitis. meaning an enteritis affecting coecum as a whole, and perityphlitis an inflammation with exudation in cellular tissue round coecum. He places coecum and

Appendix on same level as regards their power of exciting inflammation of surrounding tissue. The perforations of coecum being due to tubercular, typhoid, or dysenteric ulcers &c, and that of Appendix usually to concretions. FAGGE states that Appendix disease is the primary condition in typhlitis and perityphlitis, and not coecum, and cause of

Inflammation of Appendix is generally a concretion, sometimes a foreign body, tubercular, or no exciting cause can be found. OSLER 1892 says that typhlitis is clinically recognised by authorities, but majority of cases are unquestionably due to Appendix disease. We cannot affirm that an inflammation in the coecum or in the pericoecal tissue can never exist without the Appendix having been previously inflamed as pathology is unknown. Clinical and pathological evidence however is opposed to coecal connection with severe degrees of peritonitis. OSLER has met with two cases of perforation of a coecal ulcer, and pericoecal abscess, but the cause is so rare that it may be disregarded. In the following text, I exclude all inflammations of the coecum which are found in general colitis as being outside the question under consideration. All the cases that have come under my notice from the pain and tenderness in right iliac fossa to general peritonitis can be explained in favor of Appendicular origin.

ANATOMY.

Appendix is rudiment of elongated coecum of the herbivorous and rodent animals, in which species this portion of intestinal canal, serves as a receptacle for elaboration and absorption of food. In man, during embryonic life, at an early period it ceases to grow in same proportion as the rest of the intestine and gradually retracting, at birth, it is found to be about calibre of a quill pen and of variable length. It is functionless, and its removal does not give rise to any disturbing symptoms. In structure, its walls are composed of from within outwards

- (1) Mucous Membrane, composed of retiform tissue with a number of lymphoid cells, tubular glands, capillaries, and lymphatics. In situ it is a pulpy greyish looking membrane, with numerous dark points i.e. ~~ly~~mphatic follicles.
- (2) Connective tissue, with its arteries and veins.
- (3) Muscular coat, composed of two layers, internal are circular and outer longitudinal, which are readily excited to severe and painful spasm.
- (4) Peritoneum, which is part of general peritoneum. This tonsil-like tissue is only guarded from infection by thin layer of epithelium, which when once displaced allows bacterial invasion, so producing an infective inflammation.

Position of Appendix. It is inserted into posterior

and inner aspect of caecum. In majority of cases, as pointed out by TREVES, it lies behind end of the ileum and its mesentery, and points in direction of spleen. Next most frequent position ^{is} in ~~the~~ contact with posterior aspect of caecum; this I have seen when operating on a case of Intussusception of ileo-caecic variety. Instances are cited also where it has entered pelvis and formed adhesions with viscera. Length, is extremely variable. In 10 cases it ranged from $2\frac{1}{2}$ " to $5\frac{1}{2}$ ". The lumen of tube is narrow in comparison with thickness of walls. At orifice, by which Appendix communicates with cavity of caecum there is a semilunar fold of Mucous Membrane which probably acts as a valve, so~~x~~ that tube is continuous with intestine containing septic material.

Mesentery, described by TREVES, as a fold of peritoneum coming off from left or under layer of mesentery of ileum, and if put on stretch seems to come off at right angles from enteric mesentery. It is triangular in shape. To the right it runs up to the ileo-caecal junction, while on the left it ends in a sharp free edge. Along this free concave border, runs a single vessel viz a branch of ileo-caecic artery. The mesentery is variable in extent. In foetus it may extend to tip of Appendix; in adult it is sometimes absent, so that Appendix is free in abdomen, or it only reaches to centre of Appendix which accounts for its twisted

condition, and this torsion may be increased by distension of coecum with gas, or faecal matter, on account of its dragging upon one or other folds of mesentery.

LOCKWOOD and ROLLESTON describe three fossae in connection with arrangement of peritoneum around coecum and TREVES draws attention to the Ileo-coecal fossa. It is situated behind junction of ileum and coecum and may reach half way up ascending colon, and end close to Kidney and duodenum. In case J.K. I found upon making an incision, a large quantity of pus, and cavity extended close to Kidney.

ETIOLOGY

The majority of attacks are said to occur in early adult life, and to be much more common in the male than the female- 9 of my cases occurred between ages 10 - 20 years ; 7 between 20 - 30 ; 4 between 30 - 40; 3 between 40 - 50 and three under 10 years. Of these 10 were females and 16 males.

Of the predisposing causes Heredity seems to play an important part. In four cases, heredity shewed itself in families affected with Rheumatism eg Cases J. M. and H. M. ages 18 and 14 years respectively, suffering from Appendicitis, of which family mother was subject to attacks of arthritis. But what does the word Rheumatism signify and why should it be a factor in Appendicitis? The connection is not a distant one. The significance of the word is an altered tissue

metabolism due, in many, if not in all, instances, to the products of impaired secondary, or intestinal digestion passing into the circulatory fluids and becoming deposited in the muscles or the connective tissue elements of the nerves and joints and causing the symptoms and signs known as such. It is exactly in those people who suffer in this wise that Appendicitis may be looked for. The impairment meaning prolonged fermentative changes in the bowel causing the general effect referred to above, and the local one a catarrh of the mucous membrane. This catarrh is the explanation of the concretions forming in the Appendix, as it shares in the changes occurring in the colon. This along with my own experience tends to support the view of ROUX of Lausanne.

The anatomical situation of Appendix, is the most important predisposing cause, and explains the great frequency with which Appendix becomes seat of Inflammatory lesions in comparison with other portions of Intestine. Its dependent position renders it a trap for lodgment of faecal concretions. As it is a functionless organ it is consequently of low vitality and feeble resisting powers.

Faecal concretions according to TALAMON is a common cause of Appendicitis. He states that they must be formed in caecum and never by passage of fluid faeces into Appendix, and that most common

cause of these concretions is Chronic Colitis. The concretion is supposed to pass through valve at orifice, and either completely block, or set up so much irritation that a block soon occurs which if not relieved may give rise to grave pathological lesions. In 8 cases of series I found concretions; in five cases there was one concretion, in two there ~~xxx~~ were two and in one three. These concretions were brownish in color, varied in consistency and size from a small orange pip to a date stone. According to ROCHAZ these culculi consist of an organic stercoral matter and mineral salts chiefly calcareous, phosphates, and carbonates of lime, and are cemented together by the mucus which is secreted by glands of Appendix. The mere presence of a concretion in the Appendix is in itself not sufficient to cause Appendicitis. The process is due to the Catarrh exposing the submucous layer and allowing of the passage of bacillary fermentation through its walls. In support of this I quote the following unrecorded case, T. N. male, a lunatic, was in the habit of swallowing all kinds of rubbish eg frogs, mice, stones, pins etc. He developed a large abscess of the Liver, which weighed P. M. 144 oz, being merely a bag of pus. The only obvious change in whole intestine was a pin (black varnished) lodged in his Appendix, head upwards and

point downwards tipped with a little rust. This must have been in bowel at least a month as patient was very carefully watched ~~all~~ the time of his illness, yet he had no Appendicitis or perityphlitis, merely a liver abscess. There was not any sign of catarrh, so that unless this be present one can conclude safely that Appendicitis does not happen unless there be this catarrhal change. I am of opinion also that concretions are not formed in colon and then passed on into Appendix, as the valve of mucous membrane, already referred to, would not permit; and also that they are not rounded as TULAMON describes, but elongated and pointed. Even granting that their nucleus is formed in colon, their ultimate formation takes place in the Appendix and these concretions are inspissated catarrhal cells.

Six of the cases followed upon an indigestible meal, and majority were subject to constipation. In three cases the attack was preceded by diarrhoea. In one case attack followed upon lifting a heavy weight, and another after a blow. Two cases of interest were precipitated by labour, probably the manipulation employed or the active pressure was the cause, eg case Mrs J. was seven months pregnant when labour came on. As soon as it was over she became collapsed, very breathless and died in an hour. P M a gangrenous Appendix was found. Case Mrs R was immediately

seized with violent abdominal pain after confinement and died from general peritonitis two days afterwards. P M gangrenous Appendix. In both these cases there was a history of a previous attack.

INFECTIVE APPENDICITIS

This is probably due to a bacterial invasion of tissues of Appendix wall, and leads to a virulent degree either of general peritonitis, or of local suppurative form. It is usually accompanied by necrosis or sloughing of Appendix wall. This is most probably a coagulation necrosis, due to the virulence of the bacterial ptomaines acting upon the walls of a tissue of feeble resisting power. Some authorities state that this is caused by a concretion, but in case Mrs J (gangrenous Appendix) the perforation of Appendix wall would only admit of a fine probe and area of necrosis was size of 3d piece, which could not therefore have allowed escape of a concretion, and yet followed by most disastrous results. In case Mrs R a large part of circumference of tube was necrosed with two minute perforations and inside tube a small concretion. On microscopical examination the layer of epithelium was denuded, and a raw surface exposed to contents of tube. Cases are recorded also of gangrenous Appendix where no perforation whatever could be detected, so that

arguments in favor of Appendicitis always depending upon a calculus, which if not found in Appendix or has fallen into the peritoneal cavity through a perforation, are valueless. It is probable that the bacterial cause of Appendicitis is as a rule the BACTERIUM COLI COMMUNIS. It is invariably found in intestinal tract, and seems to do no harm if the mucous membrane be sound but if once destroyed e.g., ulceration caused by faecal concretion or by catarrhal inflammation, then the ptomainal secretion of the bacilli infiltrating the surrounding tissues through the abraded surface causes their necrosis. In almost all cases of general peritonitis and of local perityphlitic abscess the bacterium coli communis is found in the exudate. The bacteria themselves following after their secretion has impaired or paralysed the resistance of the tissues. These Bacilli are short rods with rounded ends and by LOEFFLER's method of staining flagella can be seen. First described by ESCHERICH in 1886 and was found in intestinal discharges of milk fed infants. In 1889 its pathogenic power was first shewn and since then its frequent association with pathological conditions has attracted attention, and during last few years much has been written concerning its possible pathogenic nature. It has been found after death in various severe abdominal diseases. Small injections

of pure culture have caused death in guinea-pigs in less than 24 hours, and we find marked hyperaemia and ecchymoses of small intestines, swollen Peyer's patches and usually intense congestion of peritoneum, with sometimes an accumulation of fluid in abdominal cavity. The cecum may remain unchanged, or present enlarged follicles.

A remarkable experiment by De KLECKI, which bears out what I have already written in regard to Ptomaines impairing the tissues of Appendix wall, and preparing the way for the bacillite follow. This consisted in strangulating a loop of intestine in a dog (with all antiseptic precautions) by means of an indiarubber ring and killing it after 24 - 48 hours, when general peritonitis was present and strangulated loop was nowhere perforated . In the loop of intestine experimentally converted into a closed cavity, a large brood of the microbes habitually found in intestine is produced with an increased virulence and these pass through the devitalised wall of Intestine. Constipation predisposes to this through the attendant accumulation of mucus of the Catarrhal type and the multiplication of bacilli; the bowel contents being longer retained and consequently more highly fermented and irritating. This theory would explain the deaths from peritonitis after Laparotomy, when

no other cause can be attributed, and where the bowel has had a rough handling. Applying this closed cavity experiment to the Appendix, a calculus may obliterate the canal in some part of its course, or by a stricture following inflammation. We would then have a sac adjoining the obstruction, and the microbes would have their virulence increased and Appendicitis set up.

PATHOLOGY.

Catarrhal Appendicitis - In this the visible changes are similar to those found in inflammation of mucous membranes. What the earlier and finer alterations are, can only be surmised. That there is a special tendency to determination of blood with congestion and stasis is likely when we recall the dependent position of the Appendix, and its imperfect organisation as compared with the intestine generally. The minute microscopical details of the circulatory system in the healthy human subject have never been described; while from the complexity, and importance of the histology as found in animals, where the cœcum is an important anatomical part of the Alimentary Canal, there are probably still undiscovered

reasons why the Appendix should be prone to early pathological changes peculiar to itself. This conjecture may be quite safely advanced apart from the already well known outlines of its construction. As possessing some bearing upon what as yet can only be regarded as a hypothesis; look at the horse, in which the coecum is important as a receptacle for food storage, there is a special liability to Enteritis the coecum being a most frequently affected area. In such the mucous membrane becomes congested, enormously swollen, thickened and of a velvety feeling with livid patches scattered over a surface nearly purple in colour. Of quite an opposite nature are the changes occurring here in wild rabbits the coecum walls, more markedly than in any other region of the intestine, becoming attenuated and thinned. From what can be readily followed in man, there occurs a shedding of epithelial lining of Appendix, the epithelial lining of Crypts of Lieberkuhn are extruded and the mucous membrane becomes infiltrated with leucocytes, and we get a swelling and congestion of Appendix. The lumen contains leucocytes, granular debris, mucus and casts of interior of crypts which are probably by the movements of tube moulded into a definite mass; as process continues mucosa comes to consist of a

dense cellular layer, having a ragged raw internal surface. If this shedding be not over too large a surface perfect recovery may follow by new growth of epithelium. If the epithelium be not restored, the mucosa may come to consist of granulation tissue and which by pressure of surrounding ~~xxxxxx~~ parts may either completely obliterate lumen by formation of fibrous tissue, or only partially do so, by cicatrisation. On the other hand obliteration of tube may be rendered impossible by the great thickening of tube which resists apposition of surfaces of Appendix e.g.,

Case G.H. had numerous previous attacks of Appendicitis. The Appendix was very much thickened, rigid, and required considerable pressure to bring surfaces together. The lining membrane presented a granulating appearance, and in lumen there were three small calculi.

Case J.M. had numerous previous attacks of Appendicitis. The Appendix was thickened and on slitting it up the mucous membrane almost obliterated tube.

ULCERATIVE. This may be preceded by a catarrhal condition.

Case Mrs R had several previous attacks. The tube was very much distorted, calibre thickened, half way down tube was an annular stricture, beyond which,

the tube was distended and filled with a grumous fluid. In this case the mucus would probably be destroyed by pressure of Kink, and a fibrous stricture developed at bend. A faecal concretion, by pressure upon the epithelial lining, may give rise to an ulcer with consequent fibrous stricture. From both catarrhal and ulcerative forms any degree of peritonitis may arise.

PERITONITIS.

This may be either general or localised to right iliac fossa. As it is only the somewhat later results of the processes which determine the peritonitic sequela, we see it is impossible to write definitely as to the changes which first take place upon the outer surface of the tube. Obviously the histological conformation must have a decided influence in either modifying or intensifying this condition in its early stages. While we cannot draw inferences from the classical experiments of various observers upon loops of animal intestine, or the mesenteries of frogs, such observations being made under aseptic precautions, it is of little practical importance if we bear in mind that Septicity is the important agent. If not then Peritonitis would be in itself simple, and the attack

if local as it presents itself later ____ an exudation becomes apparent on the peritoneal surface, which coagulates, and fixes intestines into a firm mass, which may undergo resolution, or by advent of the microbes and products, give rise to suppuration.

In series of cases 7 presented this local adhesive peritonitis and all recovered ending in resolution under medical treatment.

The origin of this local peritonitis still remains in doubt as these cases usually recover without operation. In each case it was the first attack. The duration of these and time which has elapsed will be found in undernoted table.

Name	Age	Duration of attack	Time since attack
A. D.	7 years.	15 Days	2½ years
E. G.	11 years	16 Days	1½ years
F. H.	7 years	21 days	1 year
M. P.	11 ^{Years} Days	15 days	1½ years
H. H.	27 years	3 months	4 years
J. B.	17 years	12 days	3 years
R	14 years	21 days	14 months

LOCAL SUPPURATION

7 Cases suppurred locally . In these the Appendix was not found as it was not considered advisable to do anything further than to make a simple incision and evacuate the pus.

In one case the abscess cavity extended behind coecum close up to right Kidney.

In two cases concretions were found in the pus and three cases had history of previous attacks.

Cases that Suppurred locally.

Name	Age	duration of last attack	Number of attacks	Result
F.M.	16years.	2 months	3	Cured
J.S.W.	19 years	2 $\frac{1}{2}$ months	1	"
G.P.	36 years	2 $\frac{1}{2}$ months	1	"
M.O.	3 years	10 days	1	"
M.I.	37 years	3 months	1	"
R.B.	23 years	2 $\frac{1}{2}$ months	2	"
J.K.	21 years	3 months	2	"

In five cases of Acute perforating Appendicitis, 4 died of general peritonitis.

Case Mrs C: operation was refused and no P.M. made.

Case Mrs J. at P.M. the Appendix had a gangrenous patch size of 3d piece, with a small perforation admitting a fine probe: it was densely adherent and lying on inner side of caecum. The whole abdominal cavity presented a diffuse purulent peritonitis.

Case Mrs R: at P.M. a large part of circumference of tube was gangrenous, with two minute perforations. Inside tube, close to base, was a small concretion which had evidently caused an abrasion of mucous surface and which was very much swollen.

Case H.M. $\frac{1}{2}$ inch from tip on side away from mesentery was a round slough with a perforation at its base, through which could be felt a concretion about size of a date stone.

Case A.P. Appendix calibre thickened, and its whole surface covered with a recent lymph. About centre of convex surface is a small puncture which admits a probe; $\frac{1}{8}$ " from base is a stricture quite impervious to a thin horse hair. Through perforation can be squeezed a little grumous fluid.

Acute perforating Appendicitis.

Name	Age	Treat	Result
Mrs R	32 years	no operation	Obt
Mrs J	42 years	no operation	Obt
Mrs C	46 years	no operation	Obt
H.M.	14 years	operation	Obt
A.P.	32 years	operation	Recovery

CLINICAL VARIETIES and SYMPTOMS.

Owing to the overlapping of the various diseases of Appendix, any classification is open to criticism. To regard them from a clinical point of view according to BARLING seems the best, and treat of them under four groups viz.-

Class I Mild Appendicitis

Class II Appendicitis with Abscess formation

Class III Acute perforating Appendicitis

Class IV Relapsing Appendicitis

I SIMPLE or MILD APPENDICITIS.

7 Cases in series were of this variety, and in these it was their first attack. Before peritoneum is affected, the disease of Appendix is probably in existence and the symptoms set up by some exciting cause e.g, several of these cases followed upon an indigestible meal, which would give rise to vigorous peristaltic movements of coecum, and thereby altering relations of diseased Appendix.

The first sign was invariably pain, which was

usually at first diffused over abdomen e, g,

Case R two hours after dinner, which partly consisted of Veal, was suddenly seized with a cramping pain over lower half of abdomen and almost immediately began to retch and subsequently vomited once. When I first saw patient, i.e, four hours afterwards he was flushed, Temperature 101° , Pulse 81. On palpation the abdomen was rigid in right iliac fossa and very tender to pressure.

2nd Day. Temperature 102° : pulse 86 : no sickness; pain localised to right iliac fossa where he was very tender to palpation and which had its greatest intensity over Mc BURNEY's point i.e, a spot about centre of a line drawn from Umbilicus to Anterior Superior Spine of Ilium marking ~~x~~ ~~max~~ the base of Appendix. There was slight muscular rigidity and hyperaesthesia of right iliac region.

3rd Day Temperature 100° . 5 : pulse 82: patient much easier. A hard mass found in right iliac fossa, with long axis running parallel with outer part of POUPART's ligament and extending $2\frac{1}{2}$ " above it. Tender on pressure. Abdomen slightly tympanitic and muscular rigidity absent.

4th Day Temperature 100° . 2 . Slightly tender to

palpation in right iliac region. Mass same as on previous day . Bowels constipated since commencement of attack.

5th Day. Temperature 100° 2. Mass as before. Bowels moved by means of an Enema.

After this the Temperature became normal and exudation slowly and gradually decreased in size until 21 days from beginning of attack when it had entirely disappeared.

The other cases of series presented somewhat similar symptoms and physical signs, with considerable variations in duration of attacks as will be seen from following table, before complete absorption of phlegmonous mass.-

A D	15 days
E G	16 days
F H	21 days
M P	15 Days
H H	3 months
J B	12 days
R	21 days

Pain : The explanation of pain being at first diffuse is to the nerve supply of Appendix, from the superior Mesenteric plexus of the Sympathetic, which also supplies the Intestines, and irritative nerve pain is apt to be referred to peripheral extremities. The pain was never very acute in those cases, but more of a griping nature. Sometimes it is felt at Umbilicus and here the great Sympathetic ganglia of Abdomen are situated.

Vomiting invariably followed in these cases but did not persist. It is due to reversed peristalsis.

Constipation was a feature in majority of cases. In one however the initial pain was accompanied by diarrhoea.

Temperature was raised in all cases from the commencement, and gradually subsided. Pulse increased according to the Temperature.

Appetite and urine were same as found in febrile conditions. In no case was there Albumin in urine.

PHYSICAL SIGNS

Muscular rigidity over right iliac fossa usually present, and this may be accounted for by the nerve supply of muscles in that region viz

Seven lower intercostals. The Superior Mesenteric plexus gets its contribution from Spinal System through Splanchnics derived from same intercostals.

PHLEGMON: This is due to the coagulated fibrinous exudation and local fixation of bowel, along with which, there may be omentum or foecal matter in bowel.

11 APPENDICITIS with ABSCESS FORMATION.

7 Cases belonged to this variety. In three there was a history of previous attacks of mild Appendicitis. An indigestible meal was found as an exciting cause and in two no cause could be traced.

Case F. M. had two previous attacks. The onset of the one under consideration was marked by sudden, violent, acute pain diffused over abdomen. Temperature 101° and this ranged between 101° - 103° until pus was evacuated. On physical examination the tenderness and rigidity were similar to what one finds in a case of mild Appendicitis. The phlegmon on 3rd day extended to within 1½" of Umbilicus, and instead of diminishing remained stationary until 12th day when an incision was made and a considerable quantity

of pus evacuated.

Of the other cases one was admitted into Hospital with redness, fluctuation, and oedema of skin over right iliac fossa. An incision was made and in the foul smelling pus a concretion was found.

Case J. K. was admitted into Hospital with usual symptoms of Appendicitis. On palpation there was no phlegmon in right iliac fossa but tender on pressure. Temperature 102° which in the course of his illness became Hectic and in three weeks an Abscess was found extending behind ascending colon close to right Kidney.

The Abscesses in remaining cases followed upon the formation of perityphlitic mass in right iliac fossa.

Sometimes the pus opens into Bowel, Bladder, or Pelvis or adhesions localising the abscess may be penetrated by the pus and general peritonitis set up.

Case J. K., already referred to, is an example of extraperitoneal suppuration. [The quantity of pus varied considerably.

The symptoms of these cases are similar at commencement to those of a mild type. If the

Temperature still keeps elevated, or becomes hectic, and the phlegmon does not diminish but becomes more tender, no further signs of pus need be waited for .

111 ACUTE PERFORATING APPENDICITIS

In all five cases of this variety the onset was very sudden. 2 immediately followed labor, 1 from lifting a heavy weight , and in 2 no exciting cause could be traced.

Case Mrs C, age 46 years, had been subject to indigestion, and during last three months had occasionally attacks of " pains in stomach " which came on at any time and had no relation to food. After lifting a heavy weight she was suddenly seized with violent pain all over abdomen and almost fainted. Bowels had acted naturally that morning . There was no vomiting . Half hour after commencement of attack her pulse was feeble and rapid and she was very thirsty, her body was cold and patient suffering from shock.

On physical examination her abdomen was hard retracted, and very tender. She died 28 hours afterwards when abdomen was distended and dulness in right iliac fossa was well marked.

Case H. M. age 14 years . Patient was of a Rheumatic diathesis, and her brother had been operated upon for Relapsing Appendicitis. In middle of night she was seized with violent pain diffused over abdomen and vomited twice. Temperature 99° : Pulse 132 feeble. Whole of abdomen was tender and retracted. Next morning , under medical treatment Temperature 100.4° : Pulse 124 and pain localised to right iliac fossa. Abdomen distended. On 3rd day she was seized with severe pain located to left side over Sigmoid flexure. Sickness constant. Operation performed but patient died from general peritonitis. Appendix perforated.

Cases Mrs R and Mrs J: Both were seized with violent pain immediately after confinement. Mrs R when first seen had pain all over abdomen, sickness, facies abdominalis. Abdomen distended and tympanitic, no pain on palpation. She died on 2nd day . P M a gangrenous Appendix with general peritonitis. Mrs J died one hour after confinement. P M a gangrenous Appendix with general peritonitis.

Case A. P.. One month ago had severe pain in epigastrium which passed off in the course of a day. Bowels always regular. In present attack he was

suddenly seized with excruciating pain in epigastrium, which was paroxysmal and radiated down to Umbilicus. Vomited twice. Temperature 100.2 : Pulse 95: On physical examination, the abdominal muscles were very tense and abdomen tympanitic all over. Liver dulness was not diminished. He was treated medically and next day Temperature and Pulse were practically normal which continued so for two days when pain was localised to right iliac fossa with its greatest intensity over Mc Burney's point. No dulness in right iliac region . On same evening he was seized with violent pain in right side of abdomen. Pulse wiry and hard. Abdominal muscles rigid and so tender that nothing could be made out. Bowels constipated. Sickness. Operation was immediately performed when a perforated Appendix was found with local peritonitis. Recovery.

From these cases it will be seen that the onset is sudden, pain violent and radiating over abdomen before becoming localised. When general peritonitis is set up the pain becomes more general. Usually sickness at commencement . Abdomen is tender to touch, rigid and retracted, and afterwards distended. Tympanitic all over with area of dulness in right iliac fossa. The Temperature may be raised, normal, or sub-normal. Pulse grows quicker and more feeble

The expression is anxious, patient gradually becomes Comatose and dies.

Four of cases developed into general peritonitis and one partial.

IV RELAPSING APPENDICITIS.

7 Cases belong to this class and number of preceding attacks varied as will be seen from following table.--

Appendix removed for Relapsing Appendicitis.

Name	Age	previous attacks	Result
R T	29 years	2	Cured
J R	29 "	2	"
J R	46 "	2	"
J B	22 "	3	"
Mrs R	25 "	numerous	"
G H	17 "	"	"
J M	18 "	"	"

The symptoms and conditions found will be illustrated in following cases.--

Case G H a female age 17 years, was admitted into Hospital complaining of aching in bowels coming on severely when she exerts herself. She is not able to walk upright but bends forwards and steps short with her right leg.

Previous history - 3 months ago she began to feel an aching pain in right side which was increased on movement. This passed off in two or three days. Since then she has had several similar attacks and has never felt really well. Bowels have always been costive, sometimes only relieved once a week.

On admission she was recovering from her last attack. Temperature normal. Tenderness on pressure and dulness in right iliac fossa.

Patient was put under medical treatment and kept in bed. In course of a week the phlegmon had disappeared and a deep pressure in right iliac fossa 2" inwards from Anterior Superior Spine of Ilium a thickening about size of finger can be made out. Patient was kept in bed for 26 days but the tenderness and thickening (which proved to be the Appendix) did not disappear, and movement still gave rise to pain. Operation was performed when Appendix was found thickened and in a Chronic Catarrhal condition with 3 small calculi in lumen. No adhesions whatever were

encountered.

The other cases presented symptoms similar to an ordinary mild attack, sometimes however the attack was more severe.

Pain in one case radiated down the right thigh and in another along the penis and movement of leg in each case gave rise to pain. Temperature was never above 102°. Between the attacks the patients usually felt out of sorts.

Case Mrs R. Appendix was very much distorted with a stricture half way. There was slight adhesions binding coecum to anterior abdominal wall.

Case R T. Appendix was embedded in a mass of adhesions at back of coecum and was twisted up behind it. In lumen was an enterolith and tube beyond was perforated.

Cases J M, J B J R. Appendix was in a Chronic Catarrhal condition with adhesions varying in density.

Case J R Appendix was thickened and glued to back of coecum and latter was adherent to posterior parietes. At tip of Appendix there was a small collection of pus.

From these cases it will be seen the Appendix

in Relapsing Appendicitis was enlarged, stenosed, or twisted, and that it may be with or without adhesions.

In the attacks of short duration the adhesions are not likely to be dense and resisting; but in severe attacks with slow convalescence and phlegmon present one may expect a deeply buried Appendix with dense adhesions. These are a serious source of discomfort, for either by the constant dull aching or the somewhat acute intervals of pain which they are invariably accompanied by, they give rise to grave apprehensions in the mind of the patient. Fears as to the probable recurrence of the attack which require to be combated by an unhesitating expression of opinion, a re-assurance, for in no class of cases does there exist so much anxiety or mental depression as in the persistent abdominal. From a careful consideration of these it would appear that the passage of solid matter along the bowel and the local accumulation of flatus ~~are~~ prolific sources of pain besides the inclusion of nerve fibres in exuded lymph while undergoing the process of organisation. That altered sensation and hyperaesthesia occur in the termination of included nerves finds general acceptance, but the connection with these more distant is not so obvious. There is ground for further enquiry, but from clinical observation it can be concluded that pain

may be reflected (or felt in an area having no connection) and complained of in an area having no physiological direct communication. As illustrative of this take the not uncommon instance of a one sided femoral hernia with adherent sac, the person, especially if a woman, complains of painful feelings in both of the Knee joints followed by flexion of the leg upon the thigh, contraction of the hamstring muscles and tenderness in the lumbar region of the Spinal Column.

There is a term viz Appendicular Colic, which has been applied to a series of symptoms presenting themselves in the region of the Vermiform Appendix. These, during the attack can scarcely be distinguished from those which occur in true Appendicitis, where adhesions have been formed, but the special signification has been reserved as denotative of a spasm of the Appendix without any obvious pathological change.

In so far as that the words themselves suggest to the mind a definite group of localised symptoms they may be accepted, but to confine myself to the belief that this portion of intestine is peculiarly affected despite of its important analogy to the coecum of animals previously referred to, seems a refinement savouring somewhat of the Classical views

as to the vagaries of the literas and their mode of being expressed " Hysteria ".

DIAGNOSIS.

MILD APPENDICITIS.

A typical case of this presents little difficulty in diagnosing, as the mode of onset, the pain which becomes localised to right iliac fossa the constitutional and general abdominal symptoms are when taken together, distinctive.

When the symptoms continue or increase, the phlegmon remains stationary or increases in size and becomes more tender, the temperature keeps high, and general condition of patient does not improve, then we may expect to find pus.

According to FITZ even as early as 3rd day an abscess may form, but my experience points to a much longer time.

We may have dulness persisting in right iliac region, if omentum and coecum are adherent to anterior abdominal parietes but no Temperature. On other hand we may have the Fever but no mass in iliac area, this

may be accounted for by pus being small in quantity and deeply situated or by abnormal position of Appendix e.g. in Pelvis, or behind coecum, giving rise to Pelvic Abscess and Retrocoecal Abscess respectively.

We must keep before us the possibility of the complications of Appendicitis such as Hepatic Abscess which takes its origin from Appendix and conveyed to Liver through the Portal System.

Of the acute perforating cases A. P. was originally diagnosed as a case of perforating Gastric Ulcer. He had severe paroxysmal pain in Epigastrium radiating to Umbilicus. In the vomit however there was no blood and as he had had a somewhat similar attack previously and recovered, medical treatment was at first resorted to. After two days Appendicular disease shewed itself and operation decided upon.

In females affections of the right broad ligament must be kept in mind, but this is usually cleared up by bimanual examination under Chloroform.

In regard to the diagnosis of different conditions of Appendix it is quite impossible to be exact.

Again it is necessary to bear in mind affections of the Coecum, and of the Ascending Colon as high as

its Hepatic flexure. These especially referred to are the result either of Catarrh set up by habitual constipation or irritating ingesta or as one of the sequelae of Typhoid Fever, coming on six or eight weeks, it may be earlier, after convalescence. Here the changes if confined to the bowel itself do not present any difficulty of diagnosis, but the products of the process appear to infiltrate the Cellular tissues behind and around , then spreading over the right antero-lateral surface of the Abdomen, cause a deposit of phlegmon (or lymph) with the hard resisting sensation common to Cellulitic affections before fluctuation sets in.

And further it is difficult to distinguish at times a local peritonitis, occurring secondary to Appendicitis, from a general peritonitis. This more particularly in individuals who have suffered from idiopathic inflammation of the peritoneum at some antecedent date. Thus in the interesting case of a male T. M. Age 68 years, who complained of acute pain commencing suddenly in the right iliac region, extending in a few hours over all the anterior surface of Abdomen with corresponding tenderness to bodily movements, having a pinched anxious countenance, thighs flexed upon the trunk, hurried respiration, continued rise of temperature, and a rapid wiry pulse,

which became later slow and feeble indicating gradual failure of the heart's action, accompanied also by a fall in temperature shortly before death. There was, post mortem, recent peritonitis confined to the area where symptoms first became manifest, but the remainder of the serous membrane investing the parietes and the under surface of the diaphragm, and in parts over the outer aspect of the intestine, were thickly studded with minute hard overgrowths of the Epithelium so as almost to resemble sand glass paper, and comparable to the changes which occur in the floors of the 3rd and 4th Ventricles of the brain in General Paralysis of the Insane, and in some forms of Alcoholic Insanity.

TREATMENT.

Many physicians advocate that operation is seldom required, while there are some Surgeons who say that every case of Appendicitis, as soon as it is diagnosed, should be operated upon.

This I consider unsatisfactory, and from my experience I say that each individual case must be carefully considered, and Surgical or Medical treatment decided according to diagnosis and pathological prognosis.

MEDICAL.

In all cases of simple Appendicitis, the following plan of treatment was adopted.

For the pain I order a large linseed poultice sprinkled with mustard, repeated every four hours until it abates, along with this Morphia either in form of Suppository or injection - dose $\frac{1}{4}$ grain . If the pain is not relieved in course of 12 - 14 hours and there are no symptoms of general peritonitis, the poultices and Morphia are repeated.

The patient is kept at rest and on no account allowed to leave his bed.

Several authorities object to the use of Opium on grounds that it destroys the peristaltic movement of Bowels, and masks the symptoms, so that the imperative need for operation is thereby disguised. On the other hand Opium gives rest to the part which in itself is of greatest importance in all inflammatory conditions: it soothes the pain, an important fact in general practice.

As regards the Bowels I usually avoid a purgative until acute symptoms have subsided, and then in form of a Glycerine Enema. Yes! but a Glycerine Enema

frequently fails, and twenty grains or so of tobacco made into an infusion with 4 oz of warm water and injected into the bowel practically never does, the danger being the great depression caused by the dilatation of all the nonstriated muscle fibres of the body, and particular regard has to be given to the pulse, being ready with a hypodermic of 3 minims of the Liquor Strychiae Hydrochloratis in case that Heart should flag markedly.

DIET : Milk and Soda water for first day in small quantities and frequently . Fluid diet in form of milk, strained gruel, clear soups &c, is given until fever subsides when return to solid food is made carefully e,g, bread and milk, fish, Chicken &c.

When patient is able to leave his bed, the bowels are kept regularly opened daily by a small teaspoonful of Castor Oil or one ounce of Olive Oil each morning in a little warm milk, and carefully dieted. A flannel belt with pad over right iliac region ^{is worn} which relieves uneasy sensation.

One case of Rheumatic diathesis was treated by administration of Soda Salicylatis, grains 10, every two hours, along with poultices, diet, and rest.

The pain was rapidly alleviated and physical signs were similar to ordinary attacks.

Leeches are recommended by BARLING, to be applied over painful spot.

All cases of this class completely recovered without operative interference, and it will be noticed from table (p 17) that the then existing attack was the first. Up to present time there has been no recurrence.

Perhaps in no other form of Appendicitis does the question of Surgical interference present so much difficulty in answering. Although greatly advocated by eminent American, and some British Surgeons, since now that Antiseptic precautions have minimised the dangers of opening the Abdominal cavity it is none the less a serious undertaking, often ending unsatisfactorily, as happens in many of the operations in Surgery which are somewhat diagnostic in purpose. The non-successes are not always published, so having obtained very successful results by an expectant method of treatment heretofore it is not to be discarded without further proofs of the greater advantages of immediately cutting down upon doubtful Appendix.

APPENDICITIS with ABSCESS FORMATION.

All cases of this class were relieved by incision as soon as pus was diagnosed.

No search was made for the Appendix as there would be danger of breaking through the limited adhesions and setting up general peritonitis.

All recovered, and there has been no return of Appendicitis.

ACUTE PERFORATING APPENDICITIS.

In case Mrs C perforating Appendicitis was early diagnosed and immediate operation recommended. This was refused and patient died of general peritonitis.

Case H. M. Operation was delayed on account of friends being from home and general peritonitis had been set up before operation was performed. Patient died of general peritonitis.

Two post puerpural cases were in a moribund condition when first seen and operation was out of

the question.

In Case A. P. which recovered, there was a leakage with limited peritonitis. Operation was performed a few hours after attack.

That the early diagnosis of these cases is of the utmost importance is evident by the early general peritonitis that is set up through the infection directly invading the peritoneal cavity. It is ushered in by sudden and severe symptoms, medical treatment is of little avail so that immediate operation presents the likeliest hope.

As supporting this view take the case of H. M. the notes on which are subjoined.

Operation 12 am Novr 15/96. A perforated Appendix with general peritonitis was found.

As there had been some doubt as to nature of case and owing to pain in left side, gurgling over Sigmoid and a fulness in that region together with sickness, non-passage of flatus, symptoms pointing to intestinal obstruction, Abdomen was opened in middle line. As soon as peritoneum incised a dark foul smelling fluid welled up and on introducing the hand general peritonitis was found. Appendix

removed, (as described under Technique P45) and abdominal cavity cleaned and glass drainage tubes inserted. Abdomen closed in one layer. Patient stood operation well.

Date 15th 2 30 pm Temperature 100 : Pulse 118 : Respirations 24. Patient has a good deal of pain no sickness, thirsty. $\frac{1}{5}$ grain Morphia hypodermically.

6 p m: Temperature 100.4 Pulse 118 Respirations ~~25~~ 24. Patient has been asleep; quite easy; very little from drainage tubes, no ^e small.

9 p m Temperature 101 ; Pulse 128; Respirations 25. Patient very thirsty, no pain, sinking.

Date 16th 3 a m; Temperature 100; Pulse 160; Respirations 24. Patient sinking, very restless and delirious.

8 a m - died.

The result was death but from my experience of similar affections in others I am of opinion that had an operation been resorted to earlier the life would have been saved.

RELAPSING APPENDICITIS.

Seven cases were operated upon for Relapsing

Appendicitis and Appendix removed. All cases ended in recovery.

After patient has a first attack the question arises, should the Appendix be removed ? If however all symptoms and signs clear up, and since we have reason to believe that a catarrhal condition may leave no organic change, and that this, the first attack, may be the last, I say that an operation is not called for. A glance at my cases of Simple Appendicitis and time elapsing since attack, fully substantiates that view.

Treatment of attack of Recurring Appendicitis is exactly on same lines as for a Simple Appendicitis.

After a second attack however a different aspect is put on case. We have now either a predisposition or one of pathological conditions already mentioned of Appendix e.g, twisting, stricture, Chronic Catarrh with concretion which by ulcerating, or becoming perforated, may be followed by escape of its contents or suppuration around it, and thus the patients life is in constant danger.

Simple medicinal measures although successful in relieving symptoms has ^{ve} no effect in preventing recurrence.

From a consideration therefore of cases that have come under my notice, I am in favor of operation after all inflammatory symptoms have subsided and after two well marked attacks of Appendicitis.

TECHNIQUE of OPERATION for APPENDICITIS.

The preparation of patient, instruments, &c is on strictest Antiseptic principles.

Incision is made about 3" long over the coecum running obliquely downwards and forwards. The various muscular layers are cut through in order viz External Oblique, Internal Oblique, Transversalis Muscle and fascia. The Peritoneum is caught up in two pairs of forceps and an incision made between.

The coecum is seized, and drawn to the surface, Sponges are packed round the inner part of the wound to shut off the general peritoneal cavity. The Superior Longitudinal Band is now traced round the end of coecum, and the Appendix sought for at its termination.

If there are no adhesions the Appendix is easily found, but if adhesions have formed especially if the result of former severe attacks, much

difficulty is experienced . If necessary the incisions may be carried back into the loin. The adhesions are gently separated with a sponge, great care being taken not to tear the coats of the coecum, or if the Appendix is low down, not to injure the Iliac Vein to which it may be adherent.

Having separated the Appendix, its mesentery is tied as close as possible to the coecum and divided.

The serous and muscular coats of the Appendix are then incised $\frac{1}{2}$ " from the coecum in a circle, and reflected from the mucous coat à la coat sleeve. A silk ligature is tied round the Appendix at its root, the Appendix is cut away , and the stump cauterised with pure Carbolic Acid. The serous and muscular coats are then tied over the stump and if necessary the whole inverted into the coecum and kept there by a row of Lembert sutures.

The whole area of operation is next sponged with dilute Corrosive Lotion (1 - 10,000) .

If there has been much haemorrhage from the adhesions or pus in any quantity it is advisable to introduce a rubber drainage tube for a period varying from 24 hours upwards according to circumstances.

All sponges are now removed , a hot flat sponge introduced until the peritoneum is closed with a fine continuous silk or catgut suture.

The Abdominal wound is closed in 3 or 4 layers:

- 1 peritoneum
- 2 Transversalis and Internal Oblique
- 3 External Oblique
- 4 Skin

Dressings, gauze, Woodwool &c

The foregoing embody the results of personal work and observation guided by the verbal and written opinions and expressions of others.

As dealing with the subject matter more from the standpoint of the Surgeon, than of the Physician, lengthy details of Medical treatment have been avoided.

Bearing in mind that the Thesis for the degree

of Doctor of Medicine constitutes a test of Knowledge
I submit my conclusions with due deference, for the
judgment of those whose experience is greater than
mine.

Finis.

R E F E R E N C E S :-

British Medical Journal

Lancet

Annals of Surgery

Clinical Journal

Practitioner

OSLER's Medicine

FAGGE do

BRISTOWE do

HAWKIN's Diseases of Vermiform Appendix

TALAMON Appendicitis

Edinburgh Medical Journal

TREVE's Surgery

KEITH's Abdominal Surgery

Medical Annual

BRAITHWAITE's Retrospects

YEO's Clinical Therapeutics